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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,367	12/12/2001	Kevin K. Lehmann	PRU-101US	8107
23122	7590	07/28/2004	EXAMINER	
RATNERPRESTIA P O BOX 980 VALLEY FORGE, PA 19482-0980				PHAM, HOA Q
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 07/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/017,367 Examiner Hoa Q. Pham	LEHMANN ET AL. Art Unit 2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 21 June 2004.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-56 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-56 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                     | Paper No(s)/Mail Date. _____ .  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____ .                                  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/21/04 has been entered.
  
2. Terminal Disclaimer filed on 6/21/04 has been approved.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-8, 11-12, 14/11, 14/12, 17-49 and 52-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stewart et al (Intra-Cavity and Ring-down Cavity absorption with Fibre Amplifier for Trace Gas Detection) in view of Fischer et al (5,168,156).

Regarding claims 1, 6, 14/11, 14/12, 18, 28, 48-49, 53-54, 56, Stewart et al discloses a passive fiber optic system for both intra-cavity and ring down absorption

measurements in trace gas detection (abstract) comprises a fiber optic ring (figure 1) having a micro-optic cell thereof exposed to the sample gas or liquid, a coherent source of radiation, coupling means (figure 1 and page 448, second paragraph) for introducing a portion of the radiation emitted by the coherent source to the passive optic ring and receiving a portion of the radiation resonant in the passive fiber optic ring, a detector (CCD array)(page 451, third paragraph) for detecting a level of the radiation received by the coupling means and generating a signal responsive thereto; and a processor (inherent) coupled to the detector for determining the level of the trace species in the gas sample or liquid sample based on the signal generated by the detector. Stewart et al does not teach that passive fiber optic ring having a portion thereof exposed to the sample or gas; however, such a feature is known in the art as taught by Fischer et al. fischer et al, from the same field of endeavor, discloses a reflective evanescent fiber-optic chemical sensor in which a portion (14) of the optical fiber (20) exposed to the sample liquid (see figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the micro-optic cell of Stewart by exposing a portion of optical fiber to the sample as taught by Fischer et al because they would function in the same manner. A substitution one for another is generally recognized as being within the level of ordinary skill in the art.

Regarding claim 2, wherein the level of the trace species is determined based on a rate of decay of the signal generated by the detector (see page 448, third paragraph of Stewart).

Regarding claims 3 and 52, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a single optical coupler instead of two couplers, thus reduce the cost of the device.

Regarding claims 4-5, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include in Stewart et al a filter placed in an optical path between the coupling means and the detector to selectively pass the received portion of radiation from the passive fiber optic loop to the detector if a certain wavelength is selected.

Regarding claims 7-8, Fischer et al teach that the exposed portion is a cladding of the fiber (column 3, lines 28-29).

Regarding claims 11-12, Stewart teaches that light source is a pulsed laser source (page 448, third paragraph “FIBRE CAVITY RING-DOWN SYSTEM”).

Regarding claims 17 and 55, see title of Fischer et al for an evanescent field of the radiation traveling within the fiber is exposed to the sample gas or sample liquid.

Regarding claims 19 and 20, Stewart et al teaches the use of a passive resonant fiber loop (page 448, last line). Thus it would have been obvious to one having ordinary skill in the art to use an optical fiber of fused silica, sapphire and fluoride based glass or from a hollow fiber because this is a known material that used for forming optical fiber.

Regarding claims 21 and 22, the passive resonant fiber is single mode fibers and multi-mode fibers (see figure 1 of Stewart et al).

Regarding claims 29 and 30, Stewart teaches the use of a coherent source is in the infrared region (page 448, second paragraph and page 449, line 2).

Regarding claim 31, Fischer et al teaches that at least a portion of the passive fiber optic ring is disposed within the liquid sample for determining a presence of the trace species in the liquid sample (figure 2).

Regarding claims 39 and 40, it is inherent that the test medium will have refractive index different from the refractive index of the fiber core. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to choose an index of refraction of the fiber is greater than an index of refraction of the sample liquid.

Regarding claims 41-44, Stewart et al discusses the loss within the passive fiber optic loop and connectors (page 448, third paragraph). Since the radiation loss in the optical fiber is significant problem, it would have been obvious to include in Stewart et al means for controlling the radiation portion that enter the fiber optic ring.

Regarding claims 45-47, Loock teaches that the fiber optic ring is at least about 15-20 meter long (page 449, line 1).

5. Claims 9-10, 13, 14/13, 15, 16 and 50-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stewart et al and Fischer et al as applied to claims 1-8 above, and further in view of Lehmann (5,528,040) (of record).

Regarding claims 9-10, Stewart et al does not explicitly teach that the coherent source of radiation is an optical parametric generator; however, such a feature is known in the art as taught by Lehmann. Lehmann, from the same field of endeavor, teaches the use of an optical parametric generator (figure 1) for trace species detection. It would

have been obvious to one of ordinary skill in the art to replace the light source of Stewart et al by an optical parametric generator taught by Lehmann because they are function in the same manner. A substitution one for another is generally recognized as being within the level of ordinary skill in the art.

Regarding claims 13,15, and 16, Lehmann teaches the use of a continuous wave laser (20) (figure 1).

Regarding claim 14/13, Stewart et al teaches that the system is a fiber optic system (see abstract).

Regarding claims 50-51, Lehmann teaches the use of a second optical detector (PD 2), which generates a trigger signal to the processor responsive to receiving radiation from the coherent source.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Shaw et al (4,530,603), Pipino (5,986,768), Largent (6,532,072) and Stewart et al (Fibre optic intra spectroscopy-combined ring down and ICLAS architectures using fibre lasers) disclose an optical fiber sensing system.

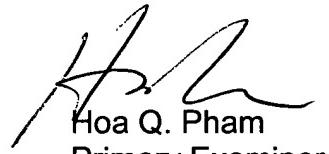
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoa Q. Pham whose telephone number is (571) 272-2426. The examiner can normally be reached on 7:30AM to 6 PM, Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800, EXT 77. The fax

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phone number for the organization where this application or proceeding is assigned is  
703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Hoa Q. Pham  
Primary Examiner  
Art Unit 2877

HP  
July 26, 2004